

## **Thermophysical Data Bank for Technically Important Gases and Liquids**

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Reliable data on thermophysical properties of substances are necessary for many scientists, engineers and students. Therefore we created thermophysical databank for technically important gases and liquids. It provides users with data for near thirty substances: monatomic and diatomic gases, air, water and steam, carbon dioxide, ammonia, some hydrocarbons and refrigerants.

For calculation of thermodynamic properties most often the unified equation of state for gas and liquid is used. For a series of substances side by side with unified equations of state the virial equations for gaseous phase which are valid at high temperatures (500-3000 K) are used also. In some cases for greater reliability two forms of equation of state can be applied. The dependences of viscosity and thermal conductivity on temperature and density are used for calculating transport properties. The coefficients of these equations and equations for calculating the ideal-gas functions, the saturated vapor pressure and the melting pressure are kept for each substance.

The system of programs ensures the calculation of compressibility factor, density, enthalpy, entropy, isochoric and isobaric specific heat, sound speed, Joule-Thomson coefficient, viscosity, thermal conductivity and some other properties. These values can be determined in the single-phase region and on the phase-equilibrium lines at temperatures from the triple point up to 500 - 1500 K and at pressures up to 100 MPa (for monatomic and diatomic gases - up to 3000 K and 300 MPa). Properties can be calculated at following nine combinations of independent variables:  $T, \rho$ ;  $T, p$ ;  $T, s$ ;  $T, x$ ;  $p, \rho$ ;  $p, h$ ;  $p, s$ ;  $p, x$ ;  $h, s$ . The software of the bank has a module structure and permits to enlarge the nomenclature of substances, properties and independent variables.

The bank is effectively used at calculating the processes of chemical, power and refrigerating plants. Now we work on inclusion in our bank the published experimental data on thermophysical properties of above-mentioned substances and equations of state for new substances.